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ABSTRACT

The relative contributions of test anxiety and exam-taking skills to information-processing deficits were investigated in a dual-task paradigm comparing high and low test-anxious students with either good or poor exam-taking skills. Sixty-four undergraduate students (21 males, 43 females) were selected based upon pre-test scores on the Test Anxiety Scale (TAS) and the Exam Behavior Scale (EBS). Students scoring above 20 on the TAS were classified as "high test-anxious" while those with TAS scores below 15 were identified as "low test-anxious." Subjects were further characterized as possessing "good exam-taking skills" if their EBS scores exceeded 20 and "poor exam-taking skills" if their scores were below 19. The Raven Advanced Progressive Matrices and Digit Span tasks were alternately completed either separately or concurrently. Subjects completed the Cognitive Interference Questionnaire and underwent a debriefing interview. Findings suggest that both test anxiety and test-taking abilities independently influence cognitive problem solving in the evaluative setting. Specifically, the possession of good exam-taking skills serves to compensate for anxiety-induced declines in information processing capacity. Nevertheless, despite such strategies, these processing deficits become apparent with increasing task demands. (Author/PN)

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Test Anxiety and Ineffective Test Taking: Different Names, Same Construct?[1]

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Abstract

The relative contributions of test anxiety and exam-taking skills to information-processing deficits were investigated in a dual-task paradigm comparing high and low test-anxious students with either good or poor exam-taking skills. Findings suggest that both test anxiety and test-taking abilities independently influence cognitive problem solving in the evaluative setting. Specifically, the possession of good exam-taking skills serves to compensate for anxiety-induced declines in information-processing capacity. Nevertheless, despite such strategies, these processing deficits become apparent with increasing task demands. Implications of current results include the subclassification of test-anxious individuals by exam-taking ability to assist selection of appropriate treatment interventions.

Test Anxiety and Ineffective Test Taking: Different Names, Same Construct?

During the past three decades, conceptualizations of test anxiety have moved from drive-oriented (Mandler & S. Sarason, 1952) to cognitive-attentional formulations (Wine, 1971), more recently, to those emphasizing skills deficits (Culler & Holahan, 1980; Kirkland & Hollandsworth, 1979, 1980). The last transition is, perhaps, the most significant since this approach holds that a deficit in adequate study habits and/or examination-taking skills, and not anxiety, is central to the impaired performance of test-anxious students. Kirkland and Hollandsworth (1980), in fact, suggest replacement of the "test anxiety" construct with "ineffective test taking" (p. 438).

Study habits and exam-taking skills of high test-anxious students are frequently poor (Culler & Holahan, 1980; Desiderato & Koskinen, 1969; Kirkland & Hollandsworth, 1979). Moreover, anxiety-reduction (e.g., desensitization) seldom improves performance on cognitive tasks, classroom tests or grade point average (Allen, Elias, & Zlotlow, 1980; Denney, 1980; Di Tomasso, 1981; Kirkland & Hollandsworth, 1980).

Nevertheless, study-skills counseling, by itself, neither lessens anxiety nor improves academic achievement (Allen, 1971; Cornish & Dilley, 1973;, Mitchell & Ng, 1972). Indeed, reviews by Allen et al. (1980), Denney (1980), and Di Tamasso (1981) all conclude that combined treatment

formats targeting both anxiety and skill levels are most successful.

From the above, it would seem that the usefulness of the test anxiety construct remains an empirical question. Meichenbaum and Butler (1980) have suggested refinement of the concept through identification of test-anxious subgroups. Along similar lines, Wine (1980) has called for a return to research paradigms examining such variables as information processing in test-anxious persons. Although there is accumulating evidence of such processing deficits (Mueller, 1980), their relationship with student skill levels is not clear (Benjamin, McKeachie, Lin, & Holinger, 1981). Experimental designs of past studies have, unfortunately, obscured differences among test-anxious persons by combining subjects of diverse study- and exam-taking skills.

Another problem with traditional test-anxiety research has been the frequent reliance upon a single criterion measure. M. W. Eysenck (1979) has demonstrated that high-anxious subjects "compensate" through increased effort in problem solving. Unless a secondary, concurrent task is also given, the decline in information-processing capacity of these individuals will not become apparent.

The present study examined the performance of low and high-test anxious subjects with either good or poor exam-taking skills on two effortful cognitive tasks completed both separately and concurrently. The investigation had several goals. First, it intended to demonstrate the existence of two subgroups of high and low test-anxious individuals with different levels of exam-taking knowledge.

Second, this study attempted to discover whether high-anxious persons with good exam skills engage in comparably efficient problem solving with their low-anxious counterparts. It was anticipated that high-anxious, exam-skilled subjects would perform similarly with low-anxious, exam-skilled individuals on a primary task owing to their exertion of additional, compensatory effort. Moreover, the exam-taking skills possessed by these students represent organizational strategies which should increase task-relevant focusing by redirecting attention outwardly. Following from the above, it was expected that both high- and low-anxious students with good exam skills would outperform poorly skilled, equally anxious peers.

On the secondary concurrent task, however, it was predicted that high-anxious, skilled persons would perform significantly worse than low-anxious, skilled peers because of the former subjects' overexpenditure of information-processing capacity on the primary task. This prediction is in direct contrast to a skills-deficit formulation which would expect no differentiation of exam-skilled students by test-anxiety level. In the current endeavor, it was also expected that test anxiety and exam skills would have a combined influence on cognitive performance. Thus, low-anxious, skilled subjects would outperform all others on the secondary task while skilled, high-anxious students should exceed unskilled high-anxious peers.

Lastly, it was anticipated that good exam-taking strategies would result in significantly less negative self-focusing in both high- and low-anxious individuals compared to their high- and low-anxious unskilled counterparts, respectively.

Method

Subjects

Sixty-four undergraduate students (21 males, 43 females) at a large southwestern university were selected for this study based upon pre-test scores on the Test Anxiety Scale (TAS; Sarason, 1972) and the Exam Behavior Scale (EBS) of Brown's (1975) Effective Study Test. Students scoring above 20 on the TAS were classified as "high test-anxious" while those with TAS scores below 15 were identified as "low test-anxious". These cutoff scores were found to approximate those used to select high and low test-anxious subjects, respectively, in several other studies (Brower & Mueller, 1978; Counts, Hollandsworth, & Alcorn, 1978; Galassi, Frierson, & Sharer, 1981).

Subsequent to classification as high or low test-anxious, subjects were further characterized as possessing "good exam-taking skills" if their EBS scores exceeded 20 and "poor exam-taking skills" if their scores were below 19. These cutoffs closely resembled the 75th and 25th percentile points, respectively, in Brown's (1975) normative college sample. They also fell within the top and bottom quartiles, respectively, in the current pre-test sample.

Based upon the above criteria, each qualifying student was assigned to one of four conditions: Low Anxiety/Poor Skills, High Anxiety/Poor Skills, Low Anxiety/Good Skills, and High Anxiety/Good Skills. Individuals within these conditions were invited to participate in the second phase

of the study, resulting in four groups of 16 subjects whose ages primarily fell in the 18 to 22 range. Table 1 presents means and standard deviations of these subjects on the TAS and EBS pre-test instruments.

Table 1

Group Means and Standard Deviations on the TAS and EBS Measures

Test Anxiety	Exam Skills	
	Poor	Good
Test Anxiety Scale[a]		
Low		
M	10.12	10.19
SD	3.14	3.19
High		
M	24.69	24.06
SD	3.63	3.80
Exam Behavior Scale[b]		
Low		
M	17.56	22.87
SD	.39	.88
High		
M	17.37	22.81
SD	.88	.83

Note. *n* = 16 for each group.

[a]Maximum score = 37

[b]Maximum score = 25

Independent Measures

Test Anxiety Scale. I. Sarason's (1972) Test Anxiety Scale is a 37-item self-report instrument of true-false format which measures anxiety that is specific to the testing situation. It has seen extensive research use and correlates highly with other test-anxiety inventories (Kirkland & Hollandsworth, 1979; I. Sarason, 1978).

Exam Behavior Scale. Brown's (1975) Effective Study Test (EST) is composed of five scales assessing skills related to academic performance. Kirkland and Hollandsworth (1979) have shown the 25-item Exam Behavior Scale (EBS) to be a better predictor of GPAs and ACT scores than any of the other individual EST scales or the EST total score. The importance of test-taking knowledge to academic achievement has led to use of the EBS to measure the "skills" variable in test anxiety research (Kirkland & Hollandsworth, 1980).

Dependent Measures

State-Trait Anxiety Inventory. The State portion of the State-Trait Anxiety Inventory (STAI-S; Spielberger, Gorsuch, & Lushene, 1970) is a 20-item scale designed to measure situational arousal. The STAI-S has been widely used in test anxiety research as a measure of emotionality experienced in the test setting (Allen et al., 1980).

Primary task. The first 20 items of Set II of the Raven Advanced Progressive Matrices (Raven, 1965) were utilized as the primary task. The Raven is an engaging, novel exercise which requires effortful cognitive processing similar to that

defined by Horn and Cattells' (1966) concept of "fluid intelligence". Other studies have also employed either the standard or advanced form of the Raven test as a performance measure in investigating test anxiety deficits (Leal, Baxter, Martin, & Marx, 1981; Meichenbaum, 1972). Moreover, Hunt (1980) has successfully used the Raven within a dual-task paradigm as the primary task.

Secondary task. A six-digit backward Digit Span test similar to that of the Wechsler Adult Intelligence Scale (Wechsler, 1955) served as the secondary or subordinate task. Such number series have routinely been utilized in the assessment of "working memory" and information processing capacity (Baddeley, 1981; Mueller, 1980). The repitition of digits in a backward direction, however, appears to require a more active processing than forward digits in the transposition and reorganization of the number series (Hayslip & Kennelly, in press; Kennelly, Crawford, Waid, & Kahaim, 1980). In addition, the presentation of six digits, at the rate of one per second, has been found to be a memory load of moderate difficulty which seems to be sensitive to momentary fluctuations in working-memory capacity (Kennelly et al., 1980). In lieu of pass-fail scoring, an interval-scale scoring system was developed for this study wherein a score of zero to six was assigned for each digit series based upon the number of digits in correct position.

Cognitive Interference Questionnaire. The Cognitive Interference Questionnaire (CIQ; I. Sarason, 1980) is an

11-item instrument on which subjects rate on a five-point scale the degree to which they experience task-irrelevant thoughts during problem-solving endeavors. Items of the CIQ closely approximate the types of self-rumination thought by Wine (1971) to interfere with the problem-solving efforts of test-anxious individuals. Increasingly used in test-anxiety research (e.g., Kirkland & Hollandsworth, 1980; Sarason & Stoops, 1978) the CIQ shows promise in helping to differentiate the cognitive processes of subgroups of test-anxious persons in evaluative settings.

Procedure

Subjects were individually tested by one of two experimenters, each of whom was blind to the students' assigned conditions. The Raven task was introduced with stress instructions emphasizing the test's relationship to intelligence and the necessity for subjects to do their "very best" on the task. Subjects were then immediately administered the STAI-S according to standardized instructions (Spielberger et al., 1970). Several sample items from Set I of the Advanced Progressive Matrices (Raven, 1965) were next presented with correction for inaccurate responses. A success rate of 75% on the practice items was required for progression to the next section of the experiment. No participants failed to meet this criterion.

After the sample Raven items, the backward Digit Span task was presented as an additional requirement of the procedure.

Specifically, subjects were informed that they would listen to a series of six tape-recorded numbers prior to each Raven problem. They were instructed to repeat the numbers back in reverse order prior to working on the matrix (separate trials). However, they were informed that, on some problems, they would be asked to work on the matrix prior to recalling the numbers (concurrent trials). The prompt, "I want you to remember this one" signalled these latter trials. Practice separate and concurrent dual-task trials were then presented, again using Set I Raven matrices as the primary task. Seven subjects who did not meet the criterion of recalling 75% of the digits in these trials were eliminated in order to insure that all participants possessed a minimal level of facility with the dual-task paradigm.

The Raven and Digit Span tasks were alternately completed either separately or concurrently such that each subject was exposed to 10 trials of matrices and digits performed concurrently and 10 trials of the two measures performed spearately. Upon completing the last trial, subjects filled in the CIQ, underwent a debriefing interview, and were dismissed.

Results

Prior to univariate analyses, a two-factor (Test Anxiety x Exam Skills) multivariate analysis of variance (MANOVA) was performed on total scores on the Raven, Digit Span (separate and concurrent presentation modes), CIQ, and State Anxiety instruments. Significant multivariate main effects

appeared for both Test Anxiety, F (5, 56) = 6.18, $p < .001$, and Exam Skills, F (5, 56) = 2.91, $p < .025$. The interaction between Exam Skills and Test Anxiety was nonsignificant, F (5, 56) = 1.04, $p > .10$. Means and standard deviations on the above dependent measures for subjects within each condition are presented in Table 2.

Total Raven scores were analyzed in a 2 x 2 (Test Anxiety x Exam Skills) analysis of variance (ANOVA). Results indicated a significant main effect for Test Anxiety only, F (1, 60) = 5.56, $p < .05$. The main effect for Exam Skills and the interaction between these two factors failed to reach significance, F (1, 60) = 1.57, $p > .10$; F (1, 60) = 1.58, $p > .10$, respectively. Planned one-tailed t-test comparisons revealed that, as predicted, high and low test-anxious subjects with good exam skills obtained comparable total Raven scores, t (30) < 1. Conversely, high test-anxious students with poor exam skills were surpassed by their low test-anxious counterparts, t (30) = 2.52, $p < .01$.

As expected, high-anxious, exam-skilled subjects exceeded high-anxious, unskilled individuals, t (30) = 1.70, $p < .05$. Yet, the presence of good versus poor exam-taking skills did not differentiate low test-anxious subjects, t (30) < 1. High anxiety and poor exam skills seemed to combine in producing the most detrimental primary-task performance, whereas good exam skills apparently served to facilitate high-anxious students' coping with the evaluative situation.

Table 2

Means and Standard Deviations on the Raven, Digit-Span, CIQ, STAI-S, and GPA Measures by Condition

Measure	Experimental Condition			
	Low Anxiety/ Poor Skills	High Anxiety/ Poor Skills	Low Anxiety/ Good Skills	High Anxiety/ Good Skills
Raven[a]				
M	15.00	12.00	14.94	14.12
SD	2.19	4.27	3.66	2.68
Digit Span[b]				
Separate				
M	53.75	50.75	57.62	54.75
SD	7.00	5.01	2.22	4.42
Concurrent				
M	54.75	48.75	57.06	51.44
SD	6.44	9.18	4.68	9.64
CIQ[c]				
M	28.87	34.94	24.94	30.44
SD	5.95	7.07	6.75	6.53
STAI-S				
M	31.50	39.37	31.87	36.31
SD	8.74	8.18	7.96	7.54
GPA				
M	2.93	2.73	3.15	3.17
SD	.50	.49	.50	.58

Note. Means for all measures are based upon 16 subjects per condition with the exception of GPA which was based upon 13 subjects. Several Freshman students in each condition had not yet received course grades during the Fall semester in which this study was run.

[a]Maximum score = 20.

[b]Maximum score for 10 trials = 60.

[c]The higher the mean, the greater the degree of negative self-focus.

A 2 x 2 x 2 (Test Anxiety x Exam Skills x Presentation Mode) ANOVA on total backward Digit Span scores revealed significant main effects for Test Anxiety, F (1, 60) = 10.10, $p < .005$, and Exam Skills, F (1, 60) = 5.48, $p < .05$. The main effect for Presentation Mode was nonsignificant, F (1, 60) = 1.95, $p > .10$. The Test Anxiety x Presentation Mode interaction was similarly nonsignificant, F (1, 60) = 2.84, $.05 < p < .10$, as were all remaining interactions ($Fs < 1$). Planned one-tailed t-test comparisons demonstrated that, consistent with an attentional-capacity formulation, high-anxious, exam-skilled subjects recalled significantly fewer digits than low test-anxious, exam-skilled students in the concurrent presentation condition, t (30) = 2.12, $p < .025$. As anticipated, low-anxious, exam-skilled subjects were superior to all other groups combined in the concurrent mode, F (1, 60) = 15.13, $p < .001$.

Contrary to expectations, anxiety was the chief mediating variable on the concurrent secondary task. High-anxious individuals recalled comparable numbers of digits in the good and poor exam-skills conditions, t (30) < 1, while low test-anxious subjects performed equally well in the good and poor skills group, t (30) < 1.

Although the Test Anxiety x Presentation Mode interaction fell short of significance, high test-anxious subjects with both good and poor exam skills remembered significantly fewer total digits on concurrent versus separate trials, t (15) = 1.81, $p < .05$; t (15) = 1.83, $p < .05$, respectively, (one-tailed

t-tests). No differences emerged for skilled and unskilled low test-anxious subjects across the two presentation methods, t (15) < 1. Thus, increased processing load had a particularly negative effect on individuals with high levels of test anxiety. Figure 1 graphically portrays the above results.

Total CIQ scores were analyzed in a 2 x 2 (Test Anxiety x Exam Skills) ANOVA. Significant main effects emerged for both Test Anxiety, F (1, 60) = 12.32, p < .001, and Exam Skills, F (1, 60) = 6.56 p < .05. The two-factor interaction was not significant, F (1, 60) < 1. Consistent with predictions, both high and low test-anxious subjects with good exam skills had fewer distracting thoughts than their unskilled counterparts, t (30) = 1.75, p < .05; t (30) = 1.87, p < .05, respectively (one-tailed tests). Nevertheless, the presence of high test anxiety, in itself, was associated with a significantly higher number of self-deprecatory, task irrelevant thoughts during performance of the Raven and Digit Span tasks. High-anxious, unskilled subjects reported more cognitive interference than both skilled and unskilled low test-anxious individuals, t (30) = 2.62, p < .01; t (30) = 4.09, p < .001, respectively, while high-anxious, skilled students indicated more distracting thoughts than low-anxious individuals possessing similar exam skills, t (30) = 2.10, p < .025. Interestingly, high-anxious students with good exam skills and low-anxious students with poor exam skills had comparable CIQ scores, t (30) < 1.

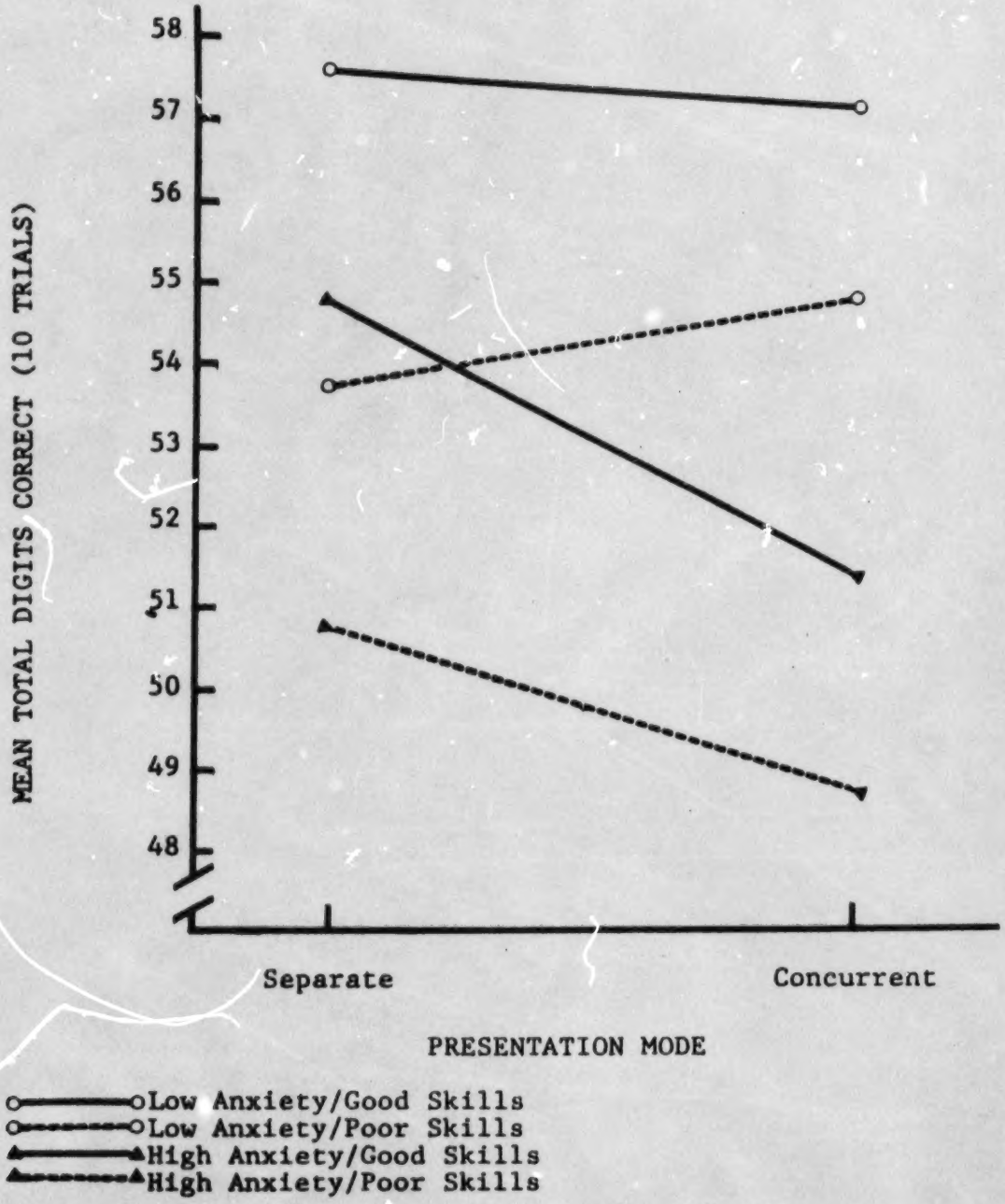

Figure 1. Mean digits retained by high and low test-anxious subjects with good and poor exam skills in the separate and concurrent presentation modes.

It would be expected that stress-inducing instructions given prior to performance of effortful cognitive tasks should especially increase the self-reported arousal of high test-anxious individuals. To evaluate this possibility, a two factor (Test Anxiety x Exam Skills) ANOVA was computed on total STAI-S scores. Consistent with the above expectation, a significant main effect for Test Anxiety emerged, F (1, 60) = 9.20, $p < .005$, with the Exam Skills main effect and the two-way interaction failing to reach significance, F (1, 60) < 1.

Post hoc two-tailed t tests demonstrated that high test anxious subjects with poor exam skills experienced more situational arousal than low test-anxious students with either poor or good exam skills, t (30) = 2.60, $p < .025$; t (30) = 2.63, $p < .025$, respectively. High test-anxious students with good exam-taking ability did not significantly differ from their low test-anxious counterparts, however, t (30) = 1.62, $p > .05$.

Because individuals with good exam-taking skills possess adequate strategies for academic efforts, it was speculated that this would be reflected in their school achievement. Self-reported grade point average was obtained from each subject (with the exception of several first semester students who had not yet received course grades). A 2 x 2 (Test Anxiety x Exam Skills) ANOVA was performed on total group GPAs (means and standard deviations presented in Table 2).

As anticipated, a significant main effect for exam skills emerged, F (1, 48) = 6.93, $p < .05$, with other effects not achieving significance (Fs < 1). Of particular interest are the comparable GPAs attained by high and low test-anxious students possessing good exam skills, t (24) < 1, suggesting that compensatory mechanisms do indeed assist some high test-anxious students in their academic efforts. Other post hoc t tests (two-tailed) additionally suggest that good exam skills are more valuable in high than low-anxious students. Skilled, test-anxious individuals exceeded their unskilled, test-anxious peers, t (24) = 2.73, $p < .05$, while possession of good versus poor exam skills did not differentiate low test-anxious students, t (24) < 1.

Discussion

Current findings suggest that test anxiety is associated with an impairment in information-processing capacity which is apparently independent of both ability and exam-taking skill. Although poor exam-taking skills are also found to contribute to processing deficits, self-reported evaluation anxiety, by itself, seems to signal lowered cognitive effectiveness when task demands are high.

Test-anxious persons appear to have a deficit in their working memory or the ability to engage in effortful cognitive processing such as was required on both tasks of the present study. These processing decrements do not emerge at the same time in all test-anxious subjects, however. Within the

current dual-task paradigm, high test-anxious students with poor exam-taking skills displayed obvious and immediate performance declines on both primary and secondary tasks. Yet, such declines became most clearly evident only on the secondary task for test-anxious subjects with good exam-taking skills. This latter finding is consistent with Eysenck's (1979) contention that anxious subjects frequently mobilize most of their attentional capacity in a compensatory manner on a task deemed primary, leaving little capacity to solve a concurrent secondary task. While exam-taking strategies may serve to focus a test-anxious student's attention toward a task, they may not be sufficient to overcome working-memory deficits resulting from the excessive effort he or she expends in maintaining this focus.

Both the CIQ measure and postexperimental verbal reports strongly implicate worry, or an internal attentional focus, as a basic mechanism underlying the above information-processing deficits. In this study, both poor exam skills and high test anxiety generated cognitive interference during problem-solving activities. These intrusive thoughts include concerns about poor performance, ability level, embarassment in front of experimenter, and potential receipt of failure feedback upon termination.

The fact that self-directed attention may arise in response to student awareness of low ability or deficient test-taking skills is consistent with positions taken by several authors (Benjamin et al., 1981; Culler & Holahan,

1980; Kirkland & Hollandsworth, 1980). Nevertheless, the negative self-focus of students possessing above-average skills clearly implies that other factors may be operational in some test-anxious students. The particular idiosyncratic meaning of evaluation for these persons and the accompanying negative self-efficacy expectations (Bandura, 1977) may contribute to their cognitive interference during mental-task performance.

The specific contribution of state anxiety (emotionality) to test anxiety deficits is less clear. However, low test-taking skill, coupled with high test anxiety, was associated with increased levels of state anxiety. This is consistent with Deffenbacher's (1977) finding that emotionality appears to be most debilitating when it occurs within high levels of worry.

How may the present results be integrated into a model of information processing in test-anxious individuals? Benjamin and his colleagues (1981), following from the work of Tobias (1979, 1980) and Mueller (1980), recently examined encoding and retrieval deficits in test anxiety. They proposed a linear formulation which posits that self-perception of one's low ability leads to achievement anxiety, which then results in poor study habits. In turn, less material is encoded in study, eventually leading to poor test performance. This is further aggravated by anxiety-induced retrieval difficulties from worry within the test situation. The authors point out

that the above steps may actually be bidirectional interactions at any point in the process.

Such a sequence appears to accurately describe high test-anxious, poorly skilled subjects in this study. Their test anxiety seems to have generalized effects, interfering with both encoding and retrieval of information. For these individuals, little control seems to exist over the allocation of attentional capacity on tasks requiring concerted mental effort (e.g., engagement in complex rehearsal strategies). Failure experiences lead to increased self-focusing of attention, additional failure, and consequent further self-attention. By the time that the unskilled test-anxious student reaches the examination, he or she is probably well involved in this self-defeating, immobilizing cycle.

Since the above "skills deficient" students possess few organizational strategies with which to negotiate the examination setting, it is likely that rigorous instruction in study methods and test-taking would best meet their needs. Our present results suggest that, as Kirkland and Hollandsworth (1979, 1980) state, a majority of test-anxious students may fall within this low-skills subgroup. With these individuals, anxiety/worry reduction may serve simply as an adjunctive goal of counseling.

Exam-skilled, test-anxious students, conversely, are high achievers with efficient study habits. Thus, they presumably encode material well early in study. Their possession of effective strategies for study and exam-taking

facilitates the controlled allocation of attention toward task-relevant cues. In light of their compensation in most circumstances for their test anxiety, these students might be termed "anxious performers". In the university environment, they often overprepare for exams, budget their time during exams, and adopt strategies which maximize classroom success. Indeed, both Culler and Holahan (1980) and Benjamin et al. (1981) report that many test-anxious students spend high numbers of hours in study.

As the examination approaches, however, such persons may experience concentration difficulties in their final stages of study. During the actual examination, they may be unable to recall, organize, and express what they have learned. Despite their skills, the excessive effort expended in countering internal cognitive distraction places a limit upon processing capability beyond which performance effectiveness rapidly falls off. Failure feedback, or even self-perceived failure, may then initiate a positively increasing cycle of worry and performance setbacks similar to that experienced by poorly skilled students.

Information processing deficits of skilled individuals should be especially evident on test questions requiring novel or creative solutions. Difficulties in new-learning or problem solving may thus be reflected on standardized tests (e.g., GRE) for which little preparation is possible and for which task cognitive demands are great.

Interventions with the above "test-anxious" students should primarily focus upon worry and anxiety reduction through a number of techniques (stress inoculation, relaxation training, desensitization, RET, etc.). Decreasing anxiety and self-rumination should redirect attention externally toward problem solving as Wine (1971, 1980) suggests. These students would, therefore, be better able to make use of the skills which they already possess.

In summary, this study identifies two subgroups of test-anxious students with opposite levels of exam-taking ability. Moreover, it suggests that these subgroupings are meaningfully related to information-processing ability in the evaluative context. Specific treatment programs, based upon the classification of test-anxious students by exam-taking skill level must be implemented and the results evaluated before these findings acquire clinical relevance. At present, it is sufficient to state that this study demonstrates the continuing usefulness of the "test anxiety" construct from both theoretical and applied perspectives.

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